



# NOAA *Background*

## National Environmental Satellite, Data, and Information Service

Operating the country's system of environmental satellites, whose cloud images are seen daily on television weather forecasts, is one of the major responsibilities of the National Oceanic and Atmospheric Administration. NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) operates the satellites and manages the processing and distribution of millions of bits of data and images these satellites produce daily. The prime customer for the satellite data is NOAA's National Weather Service, which uses satellite data to create forecasts for television, radio, and weather advisory services.

### A WORD ABOUT NOAA. . .

The National Oceanic and Atmospheric Administration (NOAA) conducts research and gathers data about the global oceans, atmosphere, space, and sun, and applies this knowledge to science and service that touch the lives of all Americans.

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A Commerce Department agency, NOAA provides these services through five major organizations: the National Weather Service, the National Ocean Service, the National Marine Fisheries Service, the National Environmental Satellite, Data and Information Service, and Office of Oceanic and Atmospheric Research; and numerous special program units. In addition, NOAA research and operational activities are supported by the Nation's seventh uniformed service, the NOAA Corps, a commissioned officer corps of men and women who operate NOAA ships and aircraft, and serve in scientific and administrative posts.

For further information: NOAA Office of Public Affairs, 14th Street and Constitution Avenue NW, Room 6013, Washington, D.C. 20230. Phone: (202) 482-6090.

NOAA's operational environmental satellite system is composed of: geostationary operational environmental satellites (GOES) for short-range warning and "now-casting," and polar-orbiting environmental satellites (POES) for longer-term forecasting. Both kinds of satellites are necessary for providing a complete global weather monitoring system. The satellites carry search and rescue instruments, and have helped save the lives of about 10,000 people to date. The satellites are also used to support aviation safety (volcanic ash detection), and maritime/shipping safety (ice monitoring and prediction).

GOES satellites orbit the earth at the same speed as the earth rotates, thus continually watching over the same area. They are a mainstay of weather forecasting in the United States. They provide data for severe storm evaluation, information on cloud cover, winds, ocean currents, fog distribution, storm circulation and snow melt, using visual and infrared imagery. The satellites also receive transmissions from free-floating balloons, buoys and remote automatic data collection stations around the world. The weather data gathered by GOES satellites, combined with data from Doppler radars and automated surface observing systems, greatly aids weather forecasters in providing warnings of thunderstorms, winter storms, flash floods, hurricanes, and other severe weather. These warnings help to save lives, preserve property, and benefit commercial interests.

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Complementing the geostationary satellites are two polar-orbiting satellites. Constantly circling the Earth, these satellites support large-scale, long-range forecasts and numerous secondary missions. Operating as a pair, they ensure that data for any region of the Earth are no more than six hours old. The polar orbiters monitor the entire Earth, tracking atmospheric variables and providing atmospheric data and cloud images. The satellites provide visible and infrared radiometer data that are used for imaging purposes, radiation measurements, and temperature profiles. The polar orbiters' ultraviolet sensors also provide ozone levels in the atmosphere and are able to detect the "ozone hole" over Antarctica during mid-September to mid-November. Data from these satellites are valuable in forecasting models, especially for remote ocean areas, where conventional data are lacking.

NESDIS also operates satellites in the Defense Department's Defense Meteorological Satellite program. On May 5, 1994, President Clinton made the landmark decision to merge the Nation's military and civil operational meteorological satellite systems into a single, national system capable of satisfying both civil and national security requirements for space-based remotely sensed environmental data. As an early step in the convergence process, Satellite Control Authority for the existing DMSP satellites was transferred in May 1998 from the U.S. Air Force to NOAA. The command, control, and communications functions for the DMSP satellites have been combined with the control for NOAA's POES satellites at NOAA's facility in Suitland, Md.

In addition to operating satellites, NESDIS also manages global data bases for meteorology, oceanography, solid-earth geophysics, and solar-terrestrial sciences. From these sources, it develops and provides environmental data and information products and services. NESDIS gathers global data about the oceans, Earth, air, space, and sun and their interactions to describe and predict the state of the physical environment. Many other agencies, organizations, and individuals, both domestic and foreign, collect similar data for particular uses and missions. Once the data have

been collected, they are sent to NESDIS' national data centers. The centers archive the data to assist scientists in fully understanding Earth systems and long-term climatic, oceanographic and geophysical effects on the environment. The data centers are:

**National Climatic Data Center, Asheville, N.C.;** the world's largest active archive of atmospheric and climate data. NCDC archives data obtained by the National Weather Service, military services, Federal Aviation Administration, and the Coast Guard, as well as data from voluntary cooperative observers. NCDC also collects data from around the globe and has more than 150 years of data on hand. The Center provides historical perspectives on climate which are vital to studies on global climate change, the greenhouse effect, and other environmental issues. The Center stores information essential to industry, science, agriculture, hydrology, transportation, recreation, and engineering.

**National Oceanographic Data Center, Silver Spring, Md.;** serves to acquire, process, preserve, and disseminate oceanographic data. It ensures that global oceanographic data are maintained in a permanent archive that is easily accessible to the world science community and to other users. The NODC holds global physical, chemical, and biological oceanographic data. It receives foreign data from organizations and institutions in dozens of countries around the world. NODC also manages the NOAA Central Library, which holds more than 1 million volumes, including books, journals, data and information CD-ROMs, and audio and video tapes.

**National Geophysical Data Center, Boulder, Colo.** NGDC houses activities in the fields of solid earth geophysics, marine geology and geophysics, solar-terrestrial physics, and paleoclimatology. It has a cooperative agreement with the University of Colorado to handle data services for the National Snow and Ice Data Center. Although some NGDC data come from the observation programs of other NOAA activities, much more result from cooperative arrangements with universities, other government agencies, and foreign organizations. ☺

**For more information contact NESDIS Public Affairs, Suitland, Md., at (301) 457-5005. NESDIS products and services are available online. <http://www.nesdis.noaa.gov>**



# NOAA *Background*

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## NOAA Fisheries

### Who We Are

NOAA's National Marine Fisheries Service is the federal agency responsible for the stewardship of the nation's living marine resources and their habitat. The public trust responsibility is derived from numerous laws, primary of which are the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA), which were passed in the mid/late 1970s. NOAA Fisheries has both domestic and international responsibilities, and is a leading voice for the economic benefits that can be derived from sustainable use and conservation of living marine resources.

Federally managed living marine resources (generally in waters from three to 200 miles offshore) provide an important source of food and recreation for the nation, as well as thousands of jobs and a traditional way of life for many coastal communities. From the Gulf of Maine, to the Gulf of Mexico, to the Gulf of Alaska, and out to Hawaii and the Western Pacific, NOAA Fisheries scientists and resource managers work to ensure the long-term sustainable use of our nation's living marine resources and their habitats for future generations.

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The last few years have seen several profound legal and conceptual changes in the management landscape of the nation's marine fisheries—notably, major revisions to the Marine Mammal Protection Act (1994) and the Magnuson-Stevens Fishery Conservation and Management Act (1996). Our marine resource legislation is now among the strongest in the world. The Magnuson-Stevens Act provides a wide array of protections, requiring very conservative management targets, tight time frames for rebuilding stocks, consideration of habitat impacts, reducing bycatch and assessing economic impacts on fishing communities. Under the Endangered Species Act of 1988, NOAA Fisheries handles the listing, protection and recovery of threatened and endangered marine, estuarine and anadromous species. The Act requires federal agencies to use all reasonable methods available to conserve endangered and threatened species, to facilitate an increase in their populations and to improve the quality of their habitats.

Internationally, NOAA Fisheries' interests and responsibilities are wide ranging (fish, whales, sea turtles, etc). The development of the United Nations Treaty on

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Straddling Fish Stocks and Highly Migratory Fish Stocks, along with a major new emphasis on the use of a precautionary approach to fishery management, have refocused efforts on dealing with the problems of overfishing. These national and international changes direct fishery management authorities to implement programs that end overfishing quickly and rebuild overfished resources in a timely manner.

### **What We Do**

NOAA Fisheries conducts its stewardship responsibilities through a wide range of scientific research, fisheries management, protected species, and enforcement and habitat conservation programs. Using the tools provided by the Magnuson-Stevens Act, NOAA Fisheries assesses and predicts the status of fish stocks, ensures compliance with fisheries regulations, and works to reduce wasteful fishing practices. We promote the development of new markets such as aquaculture, products and technologies through industry development grants, and we assist fishers through government-guaranteed loans, technology transfer and economic incentives.

NOAA Fisheries, in conjunction with NOAA's Office of Sustainable Development and Intergovernmental Affairs, also works closely with economically distressed fishing communities in the Northeast, Southeast, Northwest and Alaska regions, to design comprehensive emergency economic assistance packages that aid displaced fishers, and help restore depleted fishery resources. These economic packages are a coordinated government response involving the Departments of Commerce, Labor, Agriculture, Housing and Urban Development, and the Small Business Administration.

Under the guidance of the Marine Mammal Protection Act and the Endangered Species Act, NOAA Fisheries recovers protected marine species, such as sea turtles, whales and dolphins, without unnecessarily impeding

economic and recreational opportunities. We support the development of innovative management strategies and technologies to reduce potential conflicts involving protected species. NOAA Fisheries develops and implements conservation and recovery plans, and works to prevent species from becoming threatened or endangered. We educate the public about the dangers of interacting with these wild marine mammals, and we encourage people to follow responsible marine mammal viewing guidelines.

### **What Are the Benefits**

Through effective conservation and management, the nation's living marine resources provide significant social and economic benefits. The sale of domestically caught fish and shellfish by commercial fishers currently exceeds \$3.5 billion, making the U.S. the fifth-largest producer of seafood in the world. In 2000 alone, U.S. consumers spent an estimated \$54.4 billion for fishery products. By producing and marketing a variety of fishery products for domestic and foreign markets, the commercial marine fishing industry contributed \$27.8 billion (in value added) to the U.S. Gross National Product (GNP). Likewise, recreational fishers and marine recreational fishing activities contribute almost an equal amount to the nation's GNP.

NOAA Fisheries works to promote sustainable fisheries and to prevent lost economic potential associated with overfishing, declining species and degraded habitats. We strive to balance competing public needs and interests in the use and enjoyment of our ocean's resources. Through its many actions, programs and research, NOAA Fisheries ensures the continued productivity and abundance of the nation's living marine resources and a bright future for the people dependent upon these resources. NOAA Fisheries' vision for the next decade is to greatly increase the nation's wealth and quality of life, through building and maintaining sustainable fisheries that support fishing industry jobs, provide safe and wholesome seafood and ensure recreational fishing opportunities. ♻️

**For more information contact NOAA Fisheries Public Affairs at (301) 713-2370 or visit the Web site at <http://www.nmfs.noaa.gov>.**



# NOAA *Background*

## **“Working For America’s Coasts”: An Introduction to the National Ocean Service (NOAA Ocean Service)**

### **The Coast: A Place to Live, Work and Play**

The coastal environment is one of our nation’s most valuable assets. It provides food for people and essential habitat for thousands of species of marine animals and plants. A healthy coast is vital to the U.S. economy. Industries such as marine transportation, fishing, tourism and recreation, and homebuilding all depend on a

vibrant coastal environment. However, an ever-increasing, more concentrated population stresses the coast in many ways. The coast and its uses face threats from erosion, wetlands loss, limited access, pollution, over development and fierce storms.

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### **Valued by the Nation**

The challenge to the nation and to the NOAA Ocean Service is to balance our use of coastal and ocean resources today with the need to protect, preserve and restore these priceless realms for future generations. NOAA Ocean Service serves the nation as part of the National Oceanic and Atmospheric Administration (NOAA). NOAA Ocean Service collects, monitors, analyzes, and provides scientific understanding about coastal resource conditions, issues, and problems. The value of NOAA Ocean Service to the nation rests on its ability to carry out studies on a national scale, to sustain long-term monitoring assessment of natural resources, and to provide a variety of products and services.

NOAA Ocean Service evolved from the nation’s first scientific agency, the Survey of the Coast, which President Thomas Jefferson established in 1807 to chart the U.S. coast and its harbors. Then, as now, our growing nation needed accurate charts of the coast to promote commerce and safe navigation.

Today, NOAA Ocean Service is a diverse organization of scientists, natural resources managers and specialists in many different fields who contribute a wide range of skills and talents to ensure that our nation’s coastal areas remain safe, healthy, and productive.

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### **NOAA Ocean Service: Coastal Stewardship and Much More...**

Imagine a future in which our coasts and oceans enjoy robust health, provide a rich bounty of resources, and are wisely managed to endure often competing uses. This vision is the inspiration for the NOAA Ocean Service, and the foundation for its primary goals:

**Promote Safe Navigation:** NOAA Ocean Service provides the nation with geo-spatial information that is necessary for safe and efficient commerce. NOAA Ocean Service supplies the nation with up-to-date digital and paper nautical charts, shoreline and airport surveys, and real-time water-level and current data. NOAA Ocean Service manages the National Spatial Reference System, which ensures the integrity and accuracy of coordinates for land surveying, transportation, mapping, construction and other uses of the Global Positioning System (GPS).

**Sustain Coastal Habitat:** Coastal habitats support more than 75 percent of our nation's commercial catch and 80 percent of our recreational catch of fish and shellfish. Escalating population growth and development along the coast have destroyed or degraded half of the habitat that is critical to marine life and to

the sustained vitality of our coastal economies. NOAA Ocean Service and its partners provide the scientific expertise and management capabilities needed by coastal managers to better tackle some of today's greatest natural resource challenges.

**Support Coastal Communities:** More than half of the nation's population lives and works within 50 miles of the coast, yet coastal areas account for only 11 percent of the nation's land mass. As commercial and residential development escalates and coastal communities continue to grow faster than inland communities, the natural resources that sustain their economic vitality are increasingly at risk. NOAA Ocean Service and its partners are helping to revitalize urban waterfronts, reduce damage from natural disasters, and promote economic growth.

**Mitigate Coastal Hazards:** The sea relentlessly erodes beaches, bluffs, and shorelines. Storms flood coastal areas. Hurricanes bring high winds, huge waves and powerful storm surges. Oil and chemical spills destroy wildlife, foul estuaries and beaches, damage habitat and jeopardize economic prosperity. Effective planning of coastal development will reduce the impacts of coastal hazards. NOAA Ocean Service provides information that helps coastal managers develop long-term plans for reducing the impacts of destructive events. ♻️

**For more information contact NOAA Ocean Service Public Affairs at (301) 713-3070 or visit the Web site at <http://www.nos.noaa.gov>.**



# NOAA *Background*

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## National Weather Service

### Who We Are

The National Weather Service is the primary source of weather data, forecasts and warnings for the United States. Television weathercasters and private meteorology companies prepare their forecasts using this information. The NWS is the sole United States official voice for issuing warnings during life-threatening weather situations. The weather service has about 4,800 employees and annual operating budget of approximately \$743.8 million.

### What We Do

The National Weather Service provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, to protect life and property and enhance the national economy. The National Weather Service has a national infrastructure in place to gather and process data from the land, sea and air.

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This includes data from familiar technologies such as weather radars and satellites and also less-familiar technologies such as data buoys for marine observations and surface observing systems for data that help the aviation industry. The National Weather Service's highly trained and skilled workforce uses sophisticated computer models, and high-speed communications systems to generate data, outlooks, forecasts and warnings.

Trained community volunteers enhance weather service operations. Cooperative observers collect weather data that becomes part of the nation's climate records. Storm spotters provide the National Weather Service with visual confirmation of severe weather events.

With the completion of the \$4.5 billion modernization program, the agency is now a leaner, more efficient operation, with 121 field offices, 13 River Forecast Centers and nine national centers. The modernized, streamlined weather service is good government and supports NOAA's commitment to creating a government that works better and costs less.

Ongoing research and development efforts yield breakthroughs in all areas of weather, hydrologic and climate forecasting. Advances in climate forecast modeling, for example, allowed National Weather Service scientists to predict the onset of the 1997-98 El Niño

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event as early as late 1996.

The National Weather Service maintains the largest meteorological telecommunications switching center in the world, sending and receiving around 400,000 weather bulletins each day through a gateway in Silver Spring, Md. This data originates from weather offices around the country.

Weather warnings don't mean anything if they aren't received by those in harm's way. The National Weather Service broadcasts public life-saving information during severe weather events and other hazardous situations on the NOAA Weather Radio network. The newest models of NOAA Weather Radios can be programmed to sound an alert for individual counties. This feature has been known to wake people with warnings when they are asleep. In addition, the National Weather Service relies on its partners in emergency management and the media to help get out severe warnings and critical forecasts keeping communities safe.

The National Weather Service uses the Internet to reach a growing number of the online population. Information includes official forecasts and warnings as well as outlooks and summaries on climate topics such as El Niño. Most weather service Internet sites are linked to the National Weather Service home page at the following address: <http://www.nws.noaa.gov>

### **What Are the Benefits**

Weather services cost each American about \$5 a year—the same price as a hamburger and fries. This investment allows the National Weather Service to issue more than 734,000 forecasts (fire weather, public, aviation, marine) and 850,000 river and flood forecasts annually. Each year, the National Weather Service issues between 45,000 and 50,000 potentially life-saving severe weather warnings.

Every day, millions of weather-based economic decisions are made in agriculture, transportation, power, construction, and other sectors of the economy. Weather and flood conditions affect the entire economy in many direct and indirect ways. Better weather, hydrologic and climate forecasts and information bring new economic opportunities to almost every sector of the economy. The labor-intensive construction industry contributes more than \$200 billion annually to the U.S. economy, and is directly dependent on accurate short- and long-range weather forecasts. National Weather Service forecasts are also critical to the commercial and private transportation sector, including airline shipping and trucking industries, nationally and internationally. Airlines, for example, rely on short-term forecasts to best position their aircraft and adjust flight routes. Long-term climate forecasts help city managers better manage the purchase of resources such as salt and sand for roads and sidewalks. Hydrologic forecasts help communities protect their property by preparing for floods.

The National Weather Service is making great strides to improve weather forecasts and warnings, with its vision of becoming America's "no surprise" weather service. The weather service has doubled the warning lead-time for tornados to approximately 12 minutes over the last five years. This extra time saves lives. Today's three-to-four day forecast is as accurate as the two day forecast was 15 years ago. The National Weather Service is working to make the 6-10 day forecast as accurate as the forecast for tomorrow.

Products issued around the clock by the National Weather Service affect the lives of every American. Important advances in the science of meteorology and hydrology, coupled with major new technological capabilities for observing and analyzing the atmosphere, will allow the National Weather Service to continue providing unprecedented weather services to the nation. ☺

**For more information contact NOAA's NWS Public Affairs at (301) 713-0622.**

**January 2002**



# NOAA *Backgrounder*

## Office of Marine and Aviation Operations

Since NOAA's beginning, much of its oceanographic, atmospheric, hydrographic, fisheries and coastal data have been collected on NOAA ships and aircraft. These flexible, multipurpose platforms support a wide range of activities related to weather forecasting and prediction, public safety, navigation and trade, natural resource management and environmental protection.

The NOAA fleet is managed, operated and maintained by the Office of Marine and Aviation Operations, or OMAO, an office made up of officers of the NOAA Corps, a uniformed service of the United States, and civilians.

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### The NOAA Research Fleet

*Ships:* OMAO is responsible for the largest fleet of research and survey vessels operated by a Federal agency. The fleet ranges from oceanographic research ships capable of exploring the world's deepest oceans and collecting atmospheric data, to smaller ships responsible for charting the nation's coastal waters. The fleet supports a wide range of marine activities, including fisheries and coastal research, nautical charting, and long-range ocean and climate studies. NOAA's ships are specially equipped and designed to support the agency's programs, and have capabilities not found in the commercial fleet. For example, NOAA fisheries vessels can conduct joint operations of fishery stock assessments and oceanography, giving scientists a complete picture of a fish species, its habitat and its surrounding environment.

*Aircraft:* OMAO also manages NOAA's fleet of aircraft. These aircraft operate throughout the world, providing a wide range of research and survey capabilities—from hurricane prediction research, to snowpack surveys for flood prediction and water resource management, to coastline mapping for erosion studies, to marine mammal surveys. Like the ships, NOAA

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aircraft are specially modified to carry instrument packages appropriate for NOAA's missions and are unique in their ability to support the agency's atmospheric and hurricane surveillance and research programs.

NOAA ships and aircraft are cost-effective and have demonstrated a sterling safety record and successful mission accomplishment while operating in frequently hazardous environments. Through OMAO's commitment to diligent maintenance, NOAA ships currently operate well beyond the normal service life of comparable research and survey ships; similarly, the life expectancy of its two P-3 "hurricane hunter" aircraft will extend far beyond their normal range. Such commitment has resulted in substantial cost savings to taxpayers.

#### **Disaster Response**

Because of their special capabilities, NOAA ships and aircraft may be called upon to provide immediate response to unpredictable events. NOAA survey ships located the wreckage of EgyptAir Flight 990, TWA Flight 800 and John F. Kennedy Jr.'s aircraft. NOAA ships, aircraft and personnel also conducted damage assessments after major spills from the *Exxon Valdez*, Persian Gulf War and *New Carissa*, and after several major hurricanes during the busy 1998 and 1999 seasons.

#### **Outsourcing**

When it is cost- or time-effective to do so, NOAA fulfills ship support needs by complementing its ships with vessels from the private sector and university fleet. These charters help meet both short- and long-term needs for oceanographic and fisheries research projects that don't require the special capabilities of the NOAA fleet. Where practical, NOAA also contracts for collection of hydrographic data.

#### **NOAA Commissioned Officer Corps**

The NOAA Corps is the smallest of the seven uniformed services of the United States. It is composed of commissioned officers—who are also scientists and engineers—who provide NOAA with an important blend of operational, management and technical skills that support the agency's science and surveying programs at sea, in the air and ashore. Corps officers operate and manage NOAA's ships and aircraft as well as serve in the agency's research laboratories and program offices throughout the nation and in remote locations around the world. For example, an officer might serve as a fisheries biologist, a space weather forecaster, a "hurricane hunter" aircraft pilot, a ship captain, or a station chief at the South Pole. NOAA Corps officers serve across all the divisions of NOAA, bringing their diverse experiences into each new assignment. ☺

For more information contact Jeanne Kouhestani, OMAO Public Affairs, at (301) 713-3431, ext. 220, or visit our Web site at <http://www.oma.noaa.gov>.



# NOAA *Backgrounder*

## NOAA Research Office of Oceanic and Atmospheric Research

### Who We Are

NOAA's research, conducted through the Office of Oceanic and Atmospheric Research (OAR), is the driving force behind NOAA environmental products and services that protect life and property and promote sustainable economic growth. Research, conducted in in-house laboratories and by extramural programs, focuses on enhancing our understanding of environmental phenomena such as tornadoes, hurricanes, climate variability, solar flares, changes in the ozone, El Niño/La Niña events, fisheries productivity, ocean currents, deep sea thermal vents, and coastal ecosystem health. NOAA Research also develops innovative technologies and observing systems.

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The NOAA Research network consists of 12 internal research laboratories, extramural research at 30 Sea Grant university and research programs, six undersea research centers, a research grants program through the Office of Global Programs, and 11 cooperative institutes with academia. NOAA's Office of Ocean Exploration and a program dedicated to Arctic research are also housed within OAR. Through NOAA and its academic partners, thousands of scientists, engineers, technicians, and graduate students participate in furthering our knowledge of natural phenomena that affect the lives of us all.

NOAA's Research serves diverse customers. The average citizen benefits through earlier warnings of threatening weather, healthier coasts and fisheries, or a broader understanding of environmental processes. The private sector uses NOAA data to make business decisions and also employs technology developed and transferred by NOAA scientists. Federal agencies, state governments, and local authorities rely on NOAA Research expertise for the sound scientific basis of crucial policy decisions related to environmental protection and restoration strategies. NOAA researchers are recognized as international leaders on environmental issues. With their international counterparts, NOAA scientists contribute to the understanding and assessment of complex issues such as ozone depletion and climate variability.

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### **What We Do**

NOAA and the nation depend on the cutting-edge research provided by NOAA Research. NOAA Research built much of the foundation for the modernization of the National Weather Service, the understanding and monitoring of climate variability, and improvements in coastal ocean health. Working under the broad themes of Climate, Atmosphere, and Ocean/Coastal Resources, NOAA scientists study the ocean's depths and the highest reaches of space to better understand our environment.

NOAA's long-term commitment to the highest quality research includes employing in-house and extramural talent to engage in six major areas:

- ☉ Continue to conduct experiments to understand natural processes (physical, geochemical, ecological);
- ☉ Build predictive models for use in weather, climate, solar, ocean, and coastal assessments and predictions;
- ☉ Develop and deploy new observing technologies to provide data to support predictive models and to document natural variability;
- ☉ Develop new analytical and forecast tools to improve weather services;
- ☉ Use new information technology to share information with other federal and academic scientists; and
- ☉ Prepare scientific assessments and information products to enhance public education and guide governmental action.

Research plans and products are developed in partnership with academia and other federal agencies, and are peer-reviewed and widely distributed. A high premium is placed on external collaboration both domestically and internationally. In addition, personnel management practices of hiring, promotion, and awards are based on demonstrable capability through internal and external peer assessment. These actions peer review, collaboration, and partnerships ensure that NOAA's research is of the highest quality and remains focused on critical issues.

### **How the Nation and the World Benefit**

Most of the environmental questions our nation and the world face are not easily answered. A strong NOAA is necessary to tackle the complex issues that only advanced scientific knowledge is able to adequately address. NOAA Research answers the call and:

- ☉ Provides comprehensive knowledge to guide national environmental policy decisions, including better predictions of the climate response to emissions changes, choices for protection of the ozone layer, and alternatives for developing coastal communities;
- ☉ Improves environmental services to the nation, including reliable predictions and assessments; and
- ☉ Promotes economic growth through science for decision-making, new technology, and partnerships with academia and industry.

NOAA is a world leader in environmental science today and is well positioned and organized to provide the sound scientific research policymakers will always need. ☉

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